Claims

What is claimed is:

1. A method of manufacturing a prosthetic spinal disc nucleus, the method comprising:

forming a hydrogel core from a hydrogel material having a natural swelling rate; and

treating the hydrogel core in a solution having a pH of greater than about 7 to transition the hydrogel core from a natural state to a treated state, wherein the hydrogel in the treated state exhibits an elevated swelling rate that is greater than the natural swelling rate.

2. The method of claim 1, further comprising:

inserting the hydrogel core into a constraining jacket.

3. The method of claim 2, wherein the hydrogel core is inserted into the constraining jacket before the step of treating the hydrogel core.

4. The method of claim 2, wherein the hydrogel core is inserted into the constraining jacket after the step of treating the hydrogel core.

5. The method of claim 1, wherein the step of treating the hydrogel core includes:

immersing a dehydrated or a hydrated hydrogel core in the solution; and dehydrating the hydrogel core.

6. The method of claim 5, wherein the alkaline solution has a pH of between about 8 and about 14.

7. The method of claim 1, wherein following the step of treating the hydrogel core, the elevated swelling rate is characterized by achieving 95% hydration in less than 50 hours, based upon an approximately 1.5 gram, dehydrated sample of the treated hydrogel core immersed in water.

8. The method of claim 7, wherein the natural swelling rate is characterized by a achieving 95% hydration after at least 72 hours, based upon an approximately 1.5 gram, dehydrated sample of the natural hydrogel core immersed in water.

9. The method of claim 1, wherein following the step of treating the hydrogel core, the elevated swelling rate is characterized by a reduction of at least 50% in time for a 1.5 gram, dehydrated sample to reach 95% hydration as compared to the natural swelling rate.

10. The method of claim 1, wherein the treated hydrogel core is characterized by releasing salt when subjected to an extraction process.

11. A method of manufacturing a prosthetic spinal disc nucleus, the method comprising:

forming a hydrogel core from a hydrogel material having a natural equilibrium swelling level; and

treating the hydrogel core in an alkaline solution having a pH of at least about 7.4 to transition the hydrogel core from a natural state to a treated state, where the hydrogel core in the treated state exhibits an elevated equilibrium swelling level that is greater than the natural equilibrium swelling level.

12. The method of claim 11, further comprising: inserting the hydrogel core into a constraining jacket.

13. The method of claim 12, wherein the hydrogel core is inserted into the constraining jacket before the step of treating the hydrogel core.

14. The method of claim 12, wherein the hydrogel core is inserted into the constraining jacket after the step of treating the hydrogel core.

15. The method of claim 11, wherein the step of treating the hydrogel includes:

immersing a dehydrated hydrogel or a hydrated hydrogel core in the alkaline solution; and dehydrating the hydrogel core.

16. The method of claim 11, wherein the alkaline solution has a pH of between about 8 and about 14.

17. The method of claim 11, wherein the elevated equilibrium swelling level is at least 110% for a device, 130% for the core alone of the natural equilibrium swelling level.

18. The method of claim 11, wherein the treated hydrogel core is characterized by releasing salt when subjected to an extraction process.

19. A method of manufacturing a prosthetic spinal disc nucleus, the method comprising:

forming a hydrogel core from a hydrogel material having a natural swelling rate and a natural equilibrium swelling level; and treating the hydrogel core in an alkaline solution having a pH of at least about 7.4 to transition the hydrogel core from a natural state to a treated state, wherein the hydrogel core in the treated state exhibits an elevated swelling rate that is greater than the natural swelling rate and an elevated equilibrium swelling level that is greater than the natural equilibrium swelling level.

20. An improved prosthetic spinal disc nucleus having a hydrogel core sized for implantation into a nucleus cavity and configured to hydrate from a dehydrated state to a hydrated state at natural swelling rate, the hydrogel core adapted to support opposing vertebrae in the hydrated state, the improvement comprising:

altering the hydrogel core to hydrate at an elevated swelling rate that is at least 125% greater than the natural swelling rate.

21. An improved prosthetic spinal disc nucleus having a hydrogel core sized for implantation into a nucleus cavity and configured to hydrated from a dehydrated state to a

natural equilibrium swelling level adapted to support opposing vertebrae, the improvement comprising:

altering the hydrogel core such that the device hydrates to an elevated equilibrium swelling level that is at least 110% greater than the natural equilibrium swelling level.

22. A prosthetic spinal disc nucleus comprising a hydrogel core having cations incorporated into the hydrogel matrix, such that the swelling rate of the hydrogel core is increased relative to a hydrogel core devoid of such cations.

23. The prosthetic spinal disc nucleus of claim 22, wherein said cation is a metallic ion.

24. The prosthetic spinal disc nucleus of claim 22, wherein said cation is an organic ion.